

Abel Ecology

**Flora and fauna assessment report
Riparian assessment report**

**for
Bunnings Penrith
301-355 Mulgoa Road, Jamisontown
SP72448**

**Proposed extensions to an existing bulky goods
warehouse**

**Date: 14 April 2015
Document No: 1380-REP-32-ISS-2
Prepared for: Bunnings Group Limited
Prepared by: Abel Ecology**



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Document history

Report	Version	Prepared by	Checked by	Submission	
				Method	Date
Draft report	Draft A	Dr Danny Wotherspoon	Venetia Keane	Email	28 Jan 15
Final	Issue 1	Dr Danny Wotherspoon	Venetia Keane	Email	4 Feb 15
Final	Issue 2	Dr Danny Wotherspoon	Venetia Keane	Email	14 Apr 15



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List of Abbreviations

EEC	Endangered Ecological Community
ESD	Ecologically Sustainable Development

Note regarding maps in this report

With regard to maps provided by the Land Information Centre, Topographic maps used with the permission of © Land and Property Information, NSW.

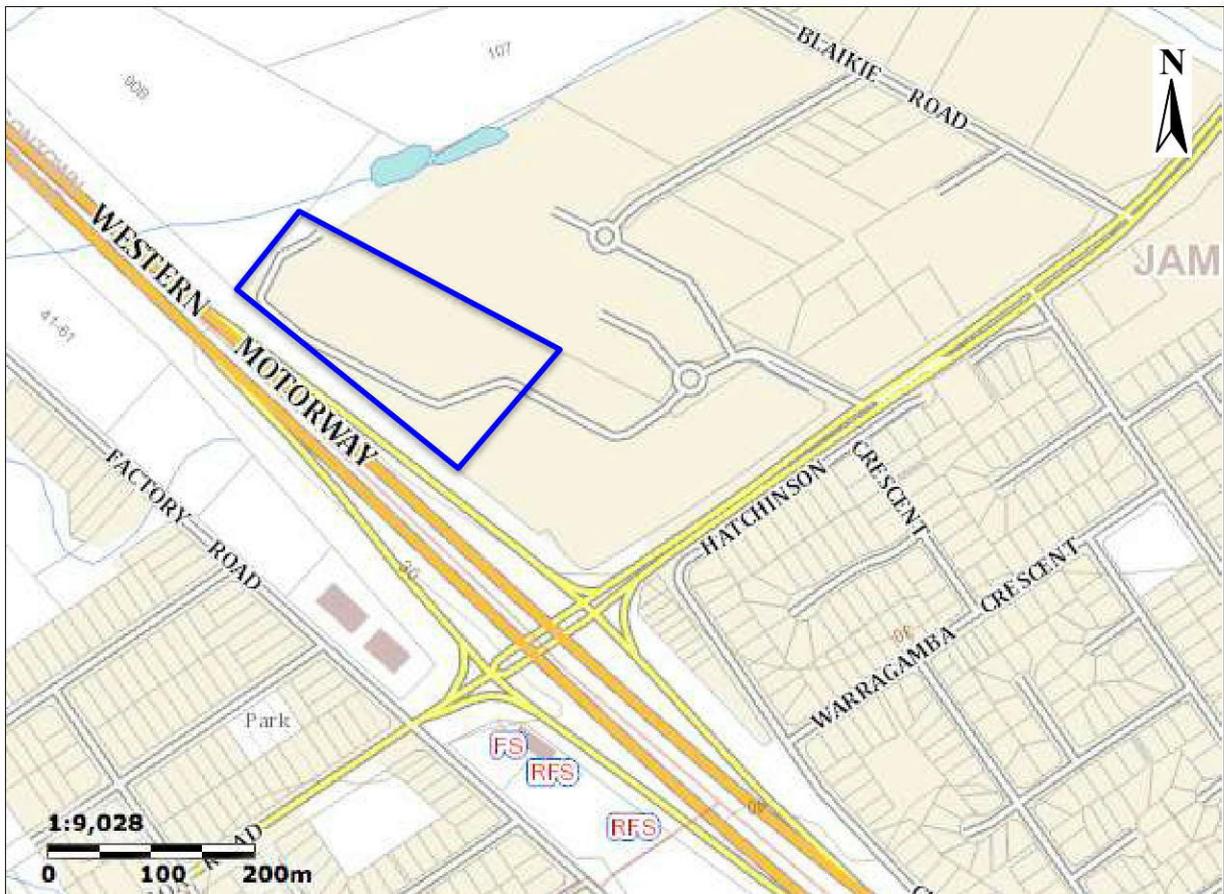


Figure 1. Locality map for Bunnings Penrith

 Site Locality

Topographic maps used with permission; © Land and Property Information NSW (Combining the Land Information Centre, Land Titles Office and Valuer General's Office).

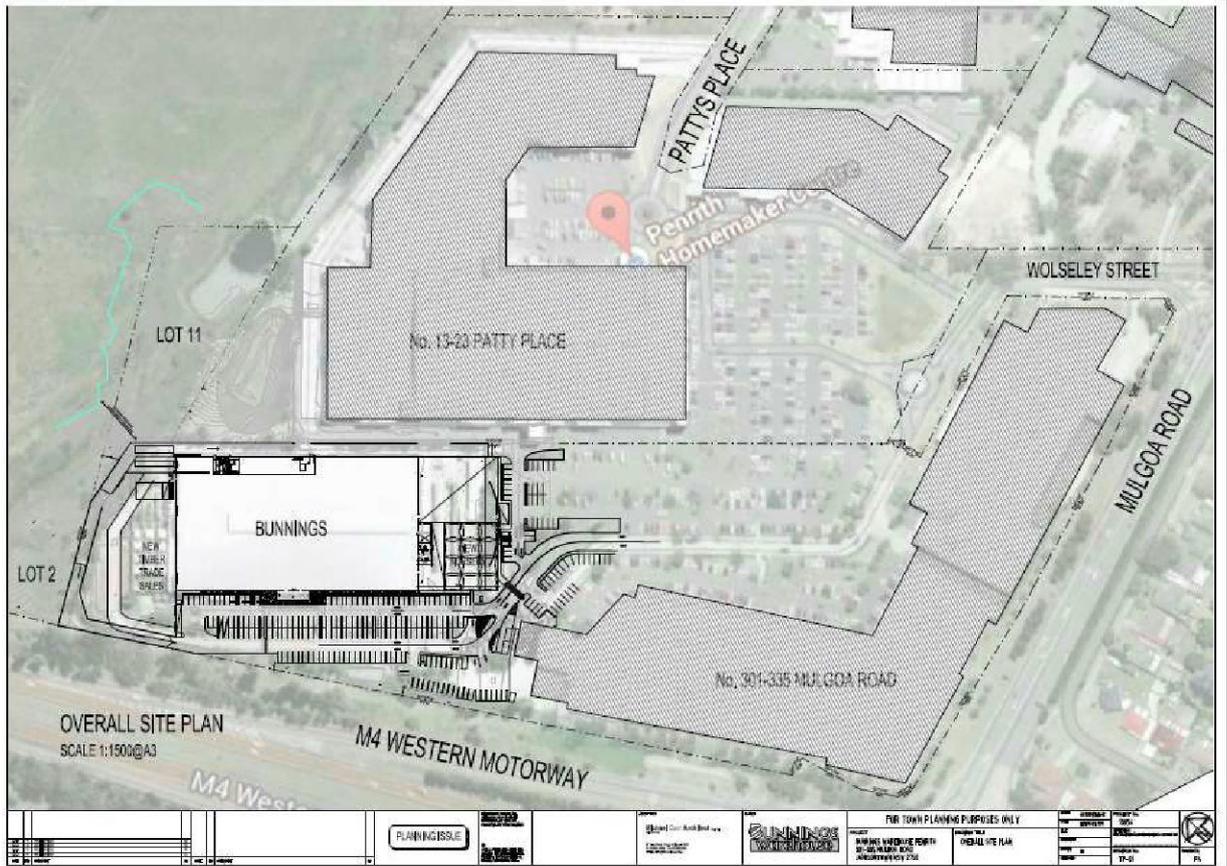


Figure 2. Context diagram for Bunnings Penrith



Figure 3. Proposal diagram for Bunnings Penrith



Figure 4. Site Map for area of proposed works



Figure 5. Air photo of the site and local area

 Site boundary



Figure 6. Topographic map of the site and local area

The red dashed line indicates the stream at least 14m from the boundary.

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Figure 7: Stream order map (Penrith DCP 2010)

Stream classification

Category 1 

40 metres wide core riparian zone (measured from top of bank +10metre buffer either side of watercourse)

Category 2 

20 metres wide core riparian zone (measured from top of bank) 10+ metre buffer either side of the watercourse

Category 3 

10 metres wide core riparian zone (measured from top of bank)

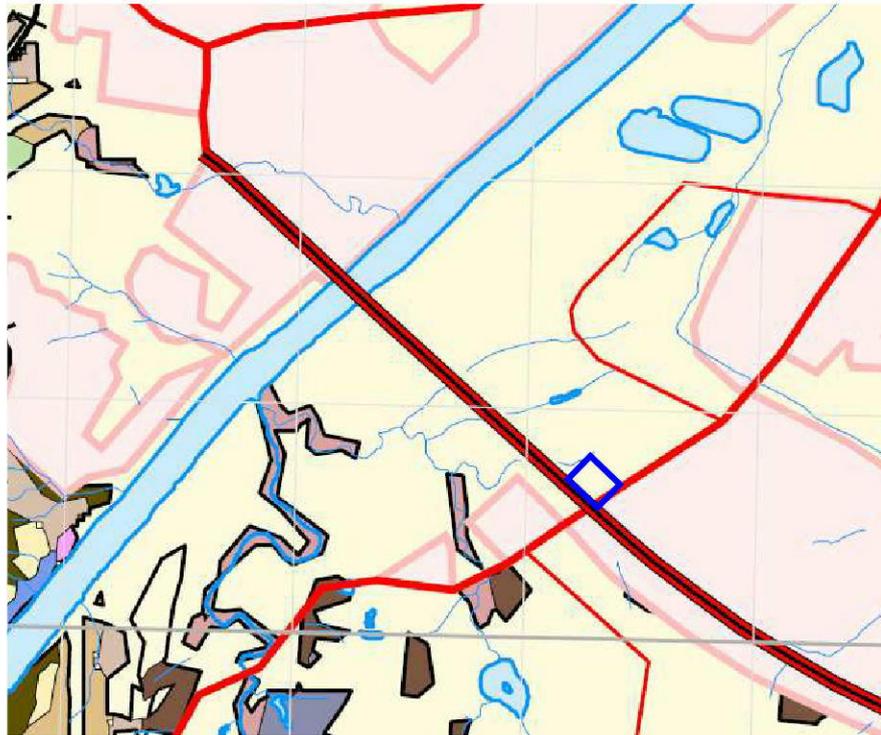


Figure 8. Vegetation map for the site and surrounding area

Key

 Site locality

 NV – Modified or disturbed land

Scale: grid square = 1 km

Source Map: Native Vegetation of the Cumberland Plain Final Edition, NSW NPWS, October 2002.
M.G. Tozer *et. al* (2010) Native vegetation of southeast NSW: a revised classification and map for the coast and eastern tablelands, Penrith vegetation map.



Figure 9. Site view



Figure 10. Site vegetation weeds on fill batter



Figure 11. Site vegetation planted Eucalypts on fill



Figure 12. Site vegetation planted swamp oaks on fill



Figure 13. Site vegetation swamp oaks and weeds on fill batter



Executive Summary

2 The proposal is to rebuild part of the existing warehouse.

4 A flora and fauna survey was carried out at the Bunnings warehouse at Jamisontown to
6 assess the likely impacts of construction on species present on the site, and whether there is
8 likely to be any significant effect on any endangered ecological community, endangered
10 population, threatened species or their habitats, as per the listings in the Threatened Species
Conservation Act 1995 (TSC Act 1995) (state legislation), the Environment Protection and
Biodiversity Conservation Act 1999 (EPBC Act 1999) (Commonwealth legislation) and other
applicable local or regional policies.

12 The site has been used as a retail shopping complex for a number of years. The land to the
west is cleared grazing paddocks from which most original vegetation has been removed.
14 The site has been excavated and filled to provide a building platform, with a retaining wall on
the northern boundary and a fill batter to the western boundary. The southern side of the site
16 has been excavated and landscaped.

18 The site has been excavated and filled so no original soil profile remains on site. A
landscaped garden has been planted and invaded by weeds. The planted trees are a mix
20 of mostly Forest Red Gum and Swamp Oak, with a dense weed understorey of the noxious
weeds Green Cestrum, Lantana and Bathurst Burr. A range of other environmental weeds
22 are present, dominated by banyard grass, stinking roger and cobblers pegs.

24 There is an unnamed tributary of School House Creek adjacent to the western boundary of
the site. There are water bodies as freshwater wetlands on the watercourse. A vehicle track
26 crosses the watercourse as a ford adjacent to the subject land.

28 The provisions of the EPBC Act 1999 do not apply to this proposal. The proposal does not
require referral to the Commonwealth.

30 There is no impediment to this proposal in the scope of this report. There is not likely to be a
32 significant effect on any endangered ecological community, threatened species or their
habitats. A Species Impact Statement is not recommended.

34 **Recommendations for this proposal include:**

36 All stormwater discharge is to be treated by a gross pollutant trap before discharge from the
site.



1. Introduction

2 A fauna and flora survey of the proposed development site at Jamisontown ('the site' –
4 Figure 1) was undertaken on 22 January 2015.

6 The main aim of this survey was to determine whether the present proposal is likely to cause a
8 significant effect on any endangered ecological community, endangered population,
10 threatened species or their habitats. This assessment is based on the seven factors listed in
12 Section 5A of the Environmental Planning and Assessment Act 1979, no. 203, (as amended),
14 which are specifically addressed in Section 8.6.1, and Appendix 1 of this report.

16 This assessment addresses both 'endangered' and 'vulnerable', as required by the
18 Threatened Species Conservation Act, 1995 (TSC Act 1995). Throughout this report
'threatened' refers to those species and communities listed as 'endangered' or 'vulnerable'
in Schedules 1 & 2 of the TSC Act 1995. 'Protected fauna' refers to any native bird, mammal
(except the dingo), reptile or amphibian in NSW.

Other planning instruments addressed include the Water Management Act 2000.

2. Description of the proposal and the site

2.1 The proposal

20 Bunnings is looking at preparing a DA for extensions to the existing warehouse (Figure 4) at
22 Mulgoa Rd Jamisontown. The proposed works will require removal of vegetation at the rear of
24 the current site and this may include trees and/or other native vegetation.

The proposal is to alter the building and consists of:

- 26 a) Building alterations and additions
- 28 b) boundary adjustments

2.2 Site description

30 For the purposes of this report, the site is defined by the property boundaries to the west end
32 of the existing Bunnings building. The site is largely paved with concrete hardstand with a
landscaped garden along the western boundary. It is 20 m above sea level.

34 There is an unnamed tributary of School House Creek adjacent to the western boundary of
36 the site (Figure 5). There are water bodies as freshwater wetlands on the watercourse (Figure
6). A vehicle track crosses the watercourse as a ford adjacent to the subject land.



2 The adjacent properties to the north and east are a retail shopping complex and to the south is the M4 motorway corridor.

4 The vegetation is described in detail in Section 5.1 below and fauna habitat is detailed in Section 4 below.

6

2.3 History of the site

8 The site has been used as a retail shopping complex for a number of years. The land to the west is cleared grazing paddocks from which most original vegetation has been removed (Figure 8).

10 The site has been excavated and filled to provide a building platform, with a retaining wall on the northern boundary and a fill batter to the western boundary. The southern side of the site has been excavated and landscaped.

14

3. Methodology

3.1 Literature review

Literature reviewed in order to assess possible issues relating to this site include:

18 Air photo/Orthophoto map SIX viewer

Survey map

20 Vegetation map

Schedules to the TSC Act 1995

22 Schedules to the EPBC Act 1999

SEPP 44 Koala Habitat Protection

24 OEH Atlas of NSW Wildlife

3.2 Field work

28 Over the two days of fieldwork a total of six hours were spent undertaking survey work on the site and surrounding habitat areas.

30 **Table 1. Survey dates and weather conditions**

Date	Times	Weather (°C)	Task	Hours (hrs x no. people)
22Jan15	1330-1530	NE breeze, 29-31°C, scattered cloud	Flora & fauna habitat survey Riparian assessment	(2 x 2) = 4
23Jan15	1012-1212	SW breeze, 29°C, scattered cloud	Tree survey	(2 x 1) = 2
			Total	6 hours



2 Survey effort was concentrated within the site boundaries, although adjacent surrounding
3 vegetation was noted (Figure 8).

4 **3.3 Fauna survey method**

5 No natural habitat occurs on the site. Some vagrant common fauna may venture into the
6 site but are unlikely to reside or depend on the site as habitat for breeding or feeding.

8 **3.4 Species likely to occur**

9 Species to be listed as 'likely to occur' or 'expected' (see Appendix 4), are common species
10 generally found in the region, which are likely to occur on site if suitable habitat is present.

11 Native flora may include species local to the area (occurring in local remnants). Structure
12 and species composition will depend upon locally occurring communities.

13 Expected species are common and, by definition, are not threatened species.
14

16

3.5 Limitations of the survey

17 This survey was conducted in the summer season. This was not suitable for winter migrant
18 birds. However there is no natural habitat, nor any planted landscape elements that would
19 be likely to be used by such fauna.

20 The weather conditions were warm and mild. This was not suitable for frog foraging.

21 Species that may use the site were not detected during the survey for the following reasons:

22 a) The species was present during the survey but was not detected due to dormancy,
23 inactivity or cryptic habits.

24 b) The species use the site at other times of the year, but was not present during the survey
25 due to being nomadic or migratory.

30 **4. Survey Results: Habitat**

4.1 Site habitat description

31 The site habitat is described below. The distribution of vegetation/habitat types on the site
32 and surrounding areas is shown in Figure 6.

34



4.1.1 Habitat 1 Landscaped gardens

2 The site has been excavated and filled so no original soil profile remains on site. A
4 landscaped garden has been planted and invaded by weeds (Figure 9, Figure 10, Figure 11,
Figure 12 and Figure 13).

6 4.2 Off-site habitat

8 There is an unnamed tributary of School House Creek 14m from the western boundary of the
site (Figure 6). There are water bodies as freshwater wetlands on the watercourse upstream
10 of the site. A vehicle track crosses the watercourse as a ford adjacent to the subject land.

12 The adjacent properties to the north and east are a retail shopping complex and to the south
is the M4 motorway corridor.

14 The land to the west, including the wetland and watercourse is grazed by cattle and is mostly
exotic pasture with a few small wattles *Acacia parramattensis*.

16

5. Survey Results: Flora

18

5.1 Vegetation description

20 The site vegetation is a planted landscape, with weed invasion. Appendix 3 shows the list of
flora found on the site.

22

24 The planted trees are a mix of mostly Forest Red Gum and Swamp Oak, with a dense weed
understorey of the noxious weeds Green Cestrum, Lantana and Bathurst Burr. A range of
other environmental weeds are present, dominated by barnyard grass, stinking roger and
26 cobbler's pegs (Figure 10).

28 6. Survey results: Fauna

6.1 Species of conservation concern

30 There are no threatened ecological communities on site nor habitat for any threatened
species of fauna. The site is isolated, with no connectivity to natural vegetation across the
32 landscape.



6.2 Fauna results

A total of nine species were detected, including birds and one reptile. Species listed as 'likely to occur' in the area are presented in Appendix 4. Note that the majority of the 'Expected Species' would not occur on the site due to the lack of habitat, but do occur in the area. All the species listed as 'likely to occur' are common throughout the locality and the region. It is unlikely that protected species will be affected at a local, regional or state-wide scale by the proposal.

The habitats for threatened species that occur in the area are tabulated in Appendix 5.

Table 2. List of fauna detected on the site

Common Name	Scientific Name	Conservation Status	Recorded AE
Birds			
Pacific Black Duck	<i>Anas superciliosa</i>		Ox
White-faced Heron	<i>Egretta novaehollandiae</i>		Ox
Spotted Turtle-dove*	<i>Streptopelia chinensis</i>		O
Superb Fairy-wren	<i>Malurus cyaneus</i>		Ox
Bell Miner	<i>Manorina melanophrys</i>		O
Yellow-faced Honeyeater	<i>Lichenostomus chrysops</i>		O
House Sparrow	<i>Passer domesticus</i>		O
Common Myna*	<i>Sturnus tristis</i>		O
Reptiles			
Eastern Water-skink	<i>Eulamprus quoyii</i>		O

Key

- * = Introduced fauna
- O = Observed
- Ox = Observed off site

6.3 Fauna Summary

The number of species from each faunal group, listed as 'likely to occur' can be seen in Appendix 4.

Mammals

No mammal species were detected on the site.

It is possible but unlikely that common bats may fly over the site but it is too small to be habitat that bats would use consistently.



Reptiles

2 One reptile species, Eastern Water Skink, was detected on the site, using dumped garden
waste piles for foraging.

4

Some common skinks such as Fence Skink or garden skinks could use the site.

6

Frogs

8 No frog species were detected on the site. It is possible that common frogs from the
adjacent wetland may enter the site.

10

Birds

12 Bird species detected on the site totalled 8.

14 The birds detected are mostly those common to highly disturbed urban areas. The Bell Miner
population is highly aggressive so will drive away most small native species.

16

Species not recorded during the survey but likely to occur on the site include Currawong.

18

6.4 Microbats

20 Foraging Habitat

This site provides potentially suitable foraging habitat for none of the eight possible
22 threatened species. *Myotis macropus* (syn. *Myotis adversus*) has no suitable foraging habitat
in the form of open water bodies on site but could possibly use the wetland and open water
24 upstream of the site.

26 Roosting Habitat

This site has no tree hollows that provide suitable roosting habitat for *Falsistrellus tasmaniensis*,
28 *Mormopterus norfolkensis*, *Scoteanax rueppellii*, *Myotis macropus*, *Miniopterus australis* and
Saccolaimus flaviventris. This site has no caves, culverts, bridges, buildings and other suitable
30 (often human-made) structures that provide potentially suitable roosting habitat for
Chalinolobus dwyeri, *Miniopterus schreibersii oceanensis*, *Myotis macropus*. *Kerivoula*
32 *papuensis* normally roosts in hanging bird nests or trees in rainforest gullies so is very unlikely to
roost in the surveyed site.

34

6.5 Feral fauna

36 Feral birds dominate the site and being highly aggressive probably account for the absence
of many native bird species.

38



7. Discussion of results

2 There is no original soil profile or vegetation on the site and no hollow trees for fauna
3 occupation.

4
5 Weed indicator species are present, indicating a high disturbance regime on the site. Feral
6 faunal indicator species, birds, are consistent with an isolated planted habitat. Feral indicator
7 species, Red Fox, indicates that native fauna abundance is likely to be low. Ecological
8 services for the site e.g. bioturbators, pollinators, seed dispersers are absent.

10 The site is in poor condition with a weed plume present that is a threat to the adjacent
11 wetland.

12
13 The proposal will remove a young planted landscape that includes a range of weed species
14 that are a threat to the adjacent wetland.

16

8. Impact on flora and fauna

18 **8.1 Long-term prospects with no development or maintenance**

19
20 The weeds will colonise adjacent lands and can bring a control order from Hawkesbury
21 County Council, the body responsible for weed control.

22 **8.2 Possible long-term condition with maintenance and removal of threats**

23
24 If weeds are removed the bank will have less habitat for feral birds and provide more basking
25 are for local native lizards and snakes.

26 **8.3 Proposal and impact**

27 **8.3.1 Short-term impact**

28 Minimal effect will occur for fauna species as there is an extensive weed plume on adjacent
29 land and landscape planting along the south boundary and along the M4 motorway will
30 remain in place.

32 **8.3.2 Long-term impact**

33
34 No negative long term impact is anticipated from removing the western part of the
35 landscape for a building proposal.



8.3.3 Stormwater, road runoff and effluent disposal

2 The site is presently mostly impervious surface so there is negligible change anticipated for the
4 adjacent watercourse.

8.4 Measures to ameliorate impact

6 All stormwater discharge is to be treated by a gross pollutant trap before discharge from the
8 site.

8.5 Measures to enhance habitat

10 None are required.

8.6 Impact on floral and faunal species, populations and communities

8.6.1 Seven-part test summary

14 Habitat requirements for locally occurring threatened faunal species, and the presence or
16 absence of such habitat on the site, is tabulated in Appendix 5. Threatened plant species,
18 listed in the TSC and EPBC Acts, shown in Appendix 6.

20 Under Section 5A of the EP&A Act several factors (listed in Appendix 1) need to be
22 considered in deciding whether there is likely to be a significant effect on threatened
species, populations or ecological communities, or their habitats. If there is likely to be a
significant effect on threatened species, etc., a Species Impact Statement is recommended.

24 There is no naturally occurring habitat on site and no preferred habitat for locally occurring
26 threatened species of fauna. There is no original soil profile remaining on site so no habitat for
28 threatened species of plants or ecological communities. While a seven part test is not required,
a test is presented to address the possibility that some microbats could possibly appear on
the site.



Table 3. Summary of the seven-part tests shown in full in Appendix 1

Species/Communities	Recorded on site	C'wealth listing EPBC Act '99	State listing TSC Act '95	Result
Insectivorous bats				
Eastern False Pipistrelle <i>Falsistrellus tasmaniensis</i>		-	Sch. 2, Vul.	No significant effect
Large-eared Pied Bat <i>Chalinolobus dwyeri</i>		Vulnerable	Sch. 2, Vul.	
Eastern Freetail-bat <i>Mormopterus norfolkensis</i>		-	Sch. 2, Vul.	
Eastern Bentwing-bat <i>Miniopterus schreibersii oceanensis</i>	No	-	Sch. 2, Vul.	
Greater Broad-nosed Bat <i>Scoteanax rueppellii</i>		-	Sch. 2, Vul.	
Yellow-bellied Sheath-tail-bat <i>Saccolaimus flaviventris</i>		-	Sch. 2, Vul.	
Little Bentwing-bat <i>Miniopterus australis</i>		-	Sch. 2, Vul.	

2

A Species Impact Statement is not recommended.

4

9. Riparian Assessment

6

9.1 Water Management Act 2000

8 The site is within 40 metres of a 'river' under the meaning of the Water Management Act
10 2000. That triggers a need to consider the potential effect of the proposal on riparian
functions of the watercourse.

12 A tributary of School House Creek runs beyond the northwest corner of the site as a first order
14 stream (Figure 1, Figure 6). The topographic map shows a blue line to indicate the
watercourse (Figure 1, Figure 6). The location of the line of flow has been surveyed and is
shown in Figure 2.

16 The watercourse at the closest point has no defined bed or banks, with the centre of the
18 drainage depression being at least 14m from the boundary and 24.5 metres from the paved
surface of the delivery laneway (Figure 2). The stream is ephemeral and is usually dry with
20 cattle grazing across the drainage depression. The permanent lagoon is upstream of a track
embankment that runs across the watercourse upstream of the site. A first order stream
22 requires a Vegetated Riparian Zone (VRZ) of 10m width from top of bank (Figure 7). As such
the Bunnings site is beyond the required VRZ and any works will not affect the riparian
24 corridor.



Landscaping for the fill batter will be revegetated with local native species selected for the characteristics of the locality.

9.2 Penrith City Council Development Control Plan 2010

The watercourse is mapped in Penrith City Council Development Control Plan 2010 (Figure C3.2 Stream Classification, page 19) as a Category 3 stream (Figure 7), requiring a ten (10) metre wide core riparian zone (measured from top of bank). No vegetated buffer is required for this watercourse (Table C3.3, page 18). Since the site and the proposed works are all greater than ten metres from the watercourse, no further consideration need be made.

9.3 Protection of the watercourse

Runoff from the site will be discharged towards the watercourse. Since there is potential for gross pollutants, nutrients, suspended sediment and oils to run off car park and driveway surfaces (Austroads 2001) a treatment device is recommended. All stormwater discharge is to be treated by a hydrodynamic separator or gross pollutant trap before discharge from the site.

10. Recommendations

All stormwater discharge is to be treated by a gross pollutant trap before discharge from the site.

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Appendix 1. Seven-part test

2 There is no natural habitat on site and no habitat features that could be habitat upon which
4 threatened species could rely. A seven part test is not required in this circumstance, however
a test is provided below.

6 The Assessment of Significance (NSW Department of Environment and Climate Change,
8 August 2007) states that “Proposed measures that mitigate, improve or compensate for the
10 action, development or activity should not be considered in determining the degree of the
effect on threatened species, populations or ecological communities, unless the measure has
been used successfully for that species in a similar situation.”

12 Insectivorous bats

Eastern False Pipistrelle *Falsistrellus tasmaniensis*

14 Large-eared Pied Bat *Chalinolobus dwyeri*

Eastern Freetail-bat *Mormopterus norfolkensis*

16 Eastern Bentwing-bat *Miniopterus schreibersii oceanensis*

Greater Broad-nosed Bat *Scoteanax rueppellii*

18 Yellow-bellied Sheath-tail-bat *Saccolaimus flaviventris*

Little Bentwing-bat *Miniopterus australis*

20

**a. in the case of a threatened species, whether the action proposed is likely to have an
22 adverse effect on the life cycle of the species such that a viable local population of the
species is likely to be placed at risk of extinction,**

24 Eastern False Pipistrelle prefers moist habitats, with trees taller than 20 m. It generally roosts in
Eucalypt hollows but has also been known to occupy space under loose bark and buildings.
26 It forages for beetles, moths and other flying insects.

28 Large-eared Pied Bat is most likely to forage for small flying insects below the forest canopy.
Its daytime roosts include caves, mine tunnels and the abandoned, bottle-shaped mud nests
30 of Fairy Martins. It is found in a variety of dry habitats, including the dry sclerophyll forests and
woodlands to the east and west of the Great Dividing Range.

32 Eastern Freetail Bat roosts in tree hollows and forages above the canopy and in uncluttered
habitats. It feeds on a variety of flying insects, such as moths, ants, cockroaches and
34 grasshoppers, foraging mainly in forests on richer soils.

36 Eastern Bentwing-bat roosts in caves, old mines, stormwater channels and comparable
structures including buildings. It forages in well-timbered valleys above the canopy.
38

40 Greater Broad-nosed Bat catches large beetles and other slow-flying insects. It inhabits a
variety of habitats including woodlands through to rainforest, though not at altitudes above



500 m. The more open vegetation is preferred by this species due to its style of flight, but in denser habitats it overcomes difficulties by using natural and man-made openings in the forest.

Yellow-bellied Sheath-tail-bat feeds in and above the canopy but comes lower to the ground in open country or mallee. It roosts in tree hollows or the abandoned nests of Sugar Gliders.

Little Bentwing-bat forages for small insects beneath the canopy of densely vegetated habitats of moist eucalypt forest, rainforest or dense coastal Banksia scrub. Daytime roosts include caves, tunnels and sometimes tree hollows.

No. Risk of extinction will increase if any factor operates to reduce population size or reproduction success. Removal or modification of habitat or changes to the nature of important periodic disturbances (fire, flood) may affect survival of species. Loss of a small planted garden is not likely to affect any local population of any threatened species.

b, in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,

Not applicable. This test is for a group of threatened species.

c. in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

i. is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

Not applicable. This test is for a group of threatened species.

ii. is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction

Not applicable. This test is for a group of threatened species.

d. in relation to the habitat of a threatened species, population or ecological community:

i. the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

Nil. Part of a planted landscaped garden will be removed.



2 **ii. whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and**

4 No. The site is isolated by urban and agricultural land.

6 **iii. the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,**

8 Negligible.

10

Criterion	Response
Assess area and quality of habitat within the locality (maps, photos, survey)	The site is a planted landscape. The closest natural forest is 360m downstream to the west, beyond the M4 motorway in Regentville.
Estimate area and quality of habitat on site in relation to the area and quality of habitat in the locality	The closest naturally occurring trees are 650m away on the bank of the Nepean River.
Assess role of habitat to be affected in sustaining habitat connectivity in the locality	Nil
Assess ecological integrity of habitat to be affected on site, in relation to the ecological integrity, tenure and security of the habitat which will remain both on site and in locality.	Nil. This is a planted landscape, some of which will be removed.

12 **e. whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),**

14 No. Critical habitat has not been declared for locally occurring threatened species.

16 **f. whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,**

18 Yes. A National recovery plan exists for Large-eared Pied Bat, but none exist for the remaining species. However, a number of priority actions have been identified for each of these species, as indicated in brackets after each name: Eastern False Pipistrelle (16), Large-eared Pied Bat (17), Eastern Freetail-bat (18), Eastern Bentwing-bat (25), Greater Broad-nosed Bat (18), Yellow-bellied Sheath-tail-bat (21) and Little Bentwing-bat (25).

24 **g. whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

26 No. Key threatening processes are listed under the TSC Act, 1995 and the Commonwealth's EPBC Act, 1999.



Conclusion

- 2 The proposed activity is unlikely to have a significant effect on Eastern False Pipistrelle, Large-
eared Pied Bat, Eastern Freetail-bat, Eastern Bentwing-bat, Greater Broad-nosed Bat, Yellow-
4 bellied Sheath-tail-bat, Little Bentwing-bat or any other species of plant or animal. Therefore a
Species Impact Statement is not recommended or required.
6



Appendix 2. Final Determinations

A full profile of all listed key threatening processes can be seen at the NSW NPWS website:
http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/home_threats.aspx

None are relevant to this proposal.



Appendix 3. Flora species list

Species	Common name	Weed status
<i>Acmena smithii</i>	Lilly Pilly	
<i>Amaranthus viridis</i> *	Green Amaranth	Environmental weed
<i>Bidens subalternans</i> *	Cobblers pegs	Environmental weed
<i>Casuarina glauca</i>	Swamp oak	
<i>Cestrum parqui</i> *	Green cestrum	Class 3 noxious
<i>Chenopodium album</i> *	Fat hen	Environmental weed
<i>Conyza bonariensis</i> *	Fleabane	Environmental weed
<i>Corymbia gummifera</i>	Red Bloodwood	
<i>Echinochloa crus-galli</i> *	Barnyard Grass	Environmental weed
<i>Eucalyptus tereticornis</i>	Forest Red Gum	
<i>Lantana camara</i> *	Lantana	Class 4 Noxious
<i>Melia azedarach</i>	White Cedar	
<i>Portulaca oleracea</i>	Pigweed	
<i>Senecio madagascariensis</i> *	Fireweed	Environmental weed
<i>Solanum nigrum</i> *	Black-berry Nightshade	Environmental weed
<i>Sida rhombifolia</i> *	Paddy's lucerne	Environmental weed
<i>Tagetes minuta</i>	Stinking Roger	Environmental weed
<i>Tecoma stans</i>	Yellow Bignonia	Environmental weed
<i>Tetragonia tetragonioides</i>	Warrigal greens	
<i>Xanthium sp</i> *	Castor oil plant/Bathurst Burr	Class 4 Noxious

Weeds are marked *

Weed Control Classes

- Class 1** - State Prohibited Weeds. *"The plant must be eradicated from the land and the land must be kept free of the plant."*
- Class 2** - Regionally Prohibited Weeds. *"The plant must be eradicated from the land and the land must be kept free of the plant."*
- Class 3** - Regionally Controlled Weeds. *"The plant must be fully and continuously suppressed and destroyed."*
- Class 4** - Locally Controlled Weeds. *"The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority."*
- Class 5** - Restricted Plants. *"The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with."*



Control objectives

The control objectives for each class is as follows:

- Class 1** is to prevent the introduction and establishment of those plants in NSW.
- Class 2** is to prevent the introduction and establishment of those plants in parts of NSW.
- Class 3** is to reduce the area and the impact of those plants in parts of NSW.
- Class 4** is to minimise the negative impact of those plants on the economy, community or environment of NSW.
- Class 5** is to prevent the introduction of those plants into NSW, the spread of those plants within NSW or from NSW to another jurisdiction.

Class 5 weeds are predominately weeds listed under the old Seeds Act, which has been repealed. There is no obligation to control Class 5 weeds. However Class 5 weeds are notifiable weeds. This means that the plant, or any animal or thing, which has the weed on it or in it, cannot be sold, purchased or offered for sale in NSW. It cannot be removed from any land to another place and it cannot be scattered on land or water.

'Sell' includes:

- (a) barter, offer or attempt to sell, receive for sale, have in possession for sale, expose for sale, send, forward or deliver for sale or cause or permit to be sold or offered for sale, or
- (b) sell for resale.



Appendix 4. Expected fauna species in the Sydney Basin

Mammals

Common name	Scientific name
White-striped Freetail-bat	<i>Tadarida australis</i>
Gould's Wattle Bat	<i>Chalinolobus gouldii</i>
Chocolate Wattle Bat	<i>Chalinolobus morio</i>
Lesser Long-eared Bat	<i>Nyctophilus geoffroyi</i>
Gould's Long-eared Bat	<i>Nyctophilus gouldi</i>
Bush Rat	<i>Rattus fuscipes</i>
Swamp Rat	<i>Rattus lutreolus</i>
Long-nosed Bandicoot	<i>Perameles nasuta</i>
Brown Antechinus	<i>Antechinus stuartii</i>
Dusky Antechinus	<i>Antechinus swainsonii</i>
Yellow-footed Antechinus	<i>Antechinus flavipes</i>
Common Wombat	<i>Vombatus ursinus</i>
Common Ringtail Possum	<i>Pseudocheirus peregrinus</i>
Sugar Glider	<i>Petaurus breviceps</i>
Feathertail Glider	<i>Acrobates pygmaeus</i>
Eastern Grey Kangaroo	<i>Macropus giganteus</i>
Large Forest Bat	<i>Vespadelus darlingtoni</i>
Little Forest Bat	<i>Vespadelus vulturinus</i>
Common Wallaroo	<i>Macropus robustus</i>
Red-necked Wallaby	<i>Macropus rufogriseus</i>
Swamp Wallaby	<i>Wallabia bicolor</i>
Common Brushtail Possum	<i>Trichosurus vulpecula</i>
Greater Glider	<i>Petauroides volans</i>
Short-beaked Echidna	<i>Tachyglossus aculeatus</i>
Fox	<i>Vulpes vulpes</i>
Black Rat	<i>Rattus rattus</i>
Rabbit	<i>Oryctolagus cuniculus</i>

Frogs

Common Name	Scientific Name
Green Tree Frog	<i>Litoria caerulea</i>
Blue Mountains Tree Frog	<i>Litoria citropa</i>
Bleating Tree Frog	<i>Litoria dentata</i>
Eastern Dwarf Tree Frog	<i>Litoria fallax</i>
Jervis Bay Tree Frog	<i>Litoria jervisiensis</i>
Broad-palmed Frog	<i>Litoria latopalmata</i>
Peron's Tree Frog	<i>Litoria peronii</i>
Leaf-green Tree Frog	<i>Litoria phyllochroa</i>
Tyler's Tree Frog	<i>Litoria tyleri</i>
Verreaux's Frog	<i>Litoria verreauxii</i>
Common Eastern Froglet	<i>Crinia signifera</i>
Eastern Banjo Frog	<i>Limnodynastes dumerilii</i>
Ornate Burrowing Frog	<i>Limnodynastes ornatus</i>
Brown-striped Frog	<i>Limnodynastes peronii</i>
Spotted Grass Frog	<i>Limnodynastes tasmaniensis</i>
Haswell's Froglet	<i>Paracrinia haswelli</i>
Smooth Toadlet	<i>Uperoleia laevigata</i>
Tyler's Toadlet	<i>Uperoleia tyleri</i>



Reptiles

Common Name	Scientific Name
Diamond Python	<i>Morelia spilota spilota</i>
Common Death Adder	<i>Acanthophis antarcticus</i>
Yellow-faced Whip Snake	<i>Demansia psammophis</i>
Common Tree Snake	<i>Dendrelaphis punctulatus</i>
Golden-crowned Snake	<i>Cacophis squamulosus</i>
Eastern Small-eyed Snake	<i>Cryptophis nigrescens</i>
Red-naped Snake	<i>Furina diadema</i>
Black-bellied Swamp Snake	<i>Hemiaspis signata</i>
Tiger Snake	<i>Notechis scutatus</i>
Red-bellied Black Snake	<i>Pseudechis porphyriacus</i>
Eastern Brown Snake	<i>Pseudonaja textilis</i>
Dwyer's Snake	<i>Parasuta dwyeri</i>
Bandy Bandy	<i>Vermicella annulata</i>
Blackish Blind Snake	<i>Ramphotyphlops nigrescens</i>
Wood Gecko	<i>Diplodactylus vittatus</i>
Lesueur's Velvet Gecko	<i>Oedura lesueurii</i>
Broad-tailed Gecko	<i>Phyllurus platurus</i>
Thick-tailed Gecko	<i>Underwoodisaurus milii</i>
Burton's Snake-lizard	<i>Lialis burtonis</i>
Common Scaly-foot	<i>Pygopus lepidopodus</i>
Jacky Lizard	<i>Amphibolurus muricatus</i>
Bearded Dragon	<i>Pogona barbata</i>
Punctate Worm-skink	<i>Anomalopus swansonii</i>
Eastern Blue-tongue	<i>Tiliqua scincoides</i>
Southern Rainbow-skink	<i>Carlia tetradactyla</i>
Cream-striped Shinning-skink	<i>Cryptoblepharus virgatus</i>
Robust Ctenotus	<i>Ctenotus robustus</i>
Copper-tailed Skink	<i>Ctenotus taeniolatus</i>
Mainland She-oak Skink	<i>Cyclodomorphus michaeli</i>
Pink-tongued Skink	<i>Cyclodomorphus gerrardii</i>
Cunningham's Skink	<i>Egernia cunninghami</i>
Black Rock Skink	<i>Egernia saxatilis</i>
White's Skink	<i>Liopholis whitii</i>
Eastern Water-skink	<i>Eulamprus quoyii</i>
Barred-sided Skink	<i>Eulamprus tenuis</i>
Dark-flecked Garden Sunskink	<i>Lampropholis delicata</i>
Pale-flecked Garden Sunskink	<i>Lampropholis guichenoti</i>
Weasel Skink	<i>Saproscincus mustelinus</i>
Red-throated Skink	<i>Acritoscincus platynota</i>
Three-toed Skink	<i>Saiphos equalis</i>
Lace Monitor	<i>Varanus varius</i>
Eastern Snake-necked Turtle	<i>Chelodina longicollis</i>



Birds

Common Name	Scientific Name
Brown Quail	<i>Coturnix ypsilophora</i>
Black Swan	<i>Cygnus atratus</i>
Australian Wood Duck	<i>Chenonetta jubata</i>
Mallard	<i>Anas platyrhynchos</i>
Pacific Black Duck	<i>Anas superciliosa</i>
Grey Teal	<i>Anas gracilis</i>
Chestnut Teal	<i>Anas castanea</i>
Australasian Grebe	<i>Tachybaptus novaehollandiae</i>
Great Crested Grebe	<i>Podiceps cristatus</i>
Hoary-headed Grebe	<i>Poliocephalus poliocephalus</i>
Little Pied Cormorant	<i>Microcarbo melanoleucos</i>
Little Black Cormorant	<i>Phalacrocorax sulcirostris</i>
Great Cormorant	<i>Phalacrocorax carbo</i>
Australian Pelican	<i>Pelecanus conspicillatus</i>
White-faced Heron	<i>Egretta novaehollandiae</i>
Little Egret	<i>Egretta garzetta</i>
White-necked Heron	<i>Ardea pacifica</i>
Great Egret	<i>Ardea alba</i>
Cattle Egret	<i>Ardea ibis</i>
Intermediate Egret	<i>Ardea intermedia</i>
Australian White Ibis	<i>Threskiornis molucca</i>
Straw-necked Ibis	<i>Threskiornis spinicollis</i>
Royal Spoonbill	<i>Platalea regia</i>
Black-shouldered Kite	<i>Elanus axillaris</i>
Whistling Kite	<i>Haliastur sphenurus</i>
Wedge-tailed Eagle	<i>Aquila audax</i>
White-bellied Sea-eagle	<i>Haliaeetus leucogaster</i>
Swamp Harrier	<i>Circus approximans</i>
Brown Goshawk	<i>Accipiter fasciatus</i>
Collared Sparrowhawk	<i>Accipiter cirrocephalus</i>
Brown Falcon	<i>Falco berigora</i>
Australian Hobby	<i>Falco longipennis</i>
Nankeen Kestrel	<i>Falco cenchroides</i>
Buff-banded Rail	<i>Gallirallus philippensis</i>
Purple Swampphen	<i>Porphyrio porphyrio</i>
Dusky Moorhen	<i>Gallinula tenebrosa</i>
Eurasian Coot	<i>Fulica atra</i>
Latham's Snipe	<i>Gallinago hardwickii</i>
Black-winged Stilt	<i>Himantopus himantopus</i>
Black-fronted Dotterel	<i>Euseyonis melanops</i>
Masked Lapwing	<i>Vanellus miles</i>
Silver Gull	<i>Chroicocephalus novaehollandiae</i>
Rock Dove	<i>Columba livia</i>
White-headed Pigeon	<i>Columba leucomela</i>
Spotted Turtle-dove	<i>Streptopelia chinensis</i>
Brown Cuckoo-dove	<i>Macropygia amboinensis</i>
Emerald Dove	<i>Chalcophaps indica</i>
Common Bronzewing	<i>Phaps chalcoptera</i>
Crested Pigeon	<i>Ocyphaps lophotes</i>
Bar-shouldered Dove	<i>Geopelia humeralis</i>
Wonga Pigeon	<i>Leucosarcia picata</i>
Topknot Pigeon	<i>Lopholaimus antarcticus</i>
Yellow-tailed Black-cockatoo	<i>Calyptorhynchus funereus</i>
Galah	<i>Eolophus roseicapilla</i>



Common Name	Scientific Name
Little Corella	<i>Cacatua sanguinea</i>
Sulphur-crested Cockatoo	<i>Cacatua galerita</i>
Rainbow Lorikeet	<i>Trichoglossus haematodus</i>
Scaly-breasted Lorikeet	<i>Trichoglossus chlorolepidotus</i>
Australian King-parrot	<i>Alisterus scapularis</i>
Crimson Rosella	<i>Platycercus elegans</i>
Eastern Rosella	<i>Platycercus eximius</i>
Fan-tailed Cuckoo	<i>Cacomantis flabelliformis</i>
Horsfield's Bronze-cuckoo	<i>Chalcites basalis</i>
Channel-billed Cuckoo	<i>Scythrops novaehollandiae</i>
Asian Koel	<i>Eudynamys scolopaceus</i>
Southern Boobook	<i>Ninox novaeseelandiae</i>
Barn Owl	<i>Tyto alba</i>
Tawny Frogmouth	<i>Podargus strigoides</i>
White-throated Nightjar	<i>Eurostopodus mystacalis</i>
Australian Owlet-nightjar	<i>Aegotheles cristatus</i>
White-throated Needle-tail	<i>Hirundapus caudacutus</i>
Laughing Kookaburra	<i>Dacelo novaeguineae</i>
Sacred Kingfisher	<i>Todiramphus sanctus</i>
Rainbow Bee-eater	<i>Merops ornatus</i>
Dollarbird	<i>Eurystomus orientalis</i>
Superb Lyrebird	<i>Menura novaehollandiae</i>
Satin Bowerbird	<i>Ptilonorhynchus violaceus</i>
Superb Fairy-wren	<i>Malurus cyaneus</i>
Variagated Fairy-wren	<i>Malurus lamberti</i>
Spotted Pardalote	<i>Pardalotus punctatus</i>
White-browed Scrubwren	<i>Sericornis frontalis</i>
Large-billed Scrubwren	<i>Sericornis magnirostra</i>
Brown Gerygone	<i>Gerygone mouki</i>
White-throated Gerygone	<i>Gerygone albogularis</i>
White-throated Treecreeper	<i>Cornobates leucophaea</i>
Brown Thornbill	<i>Acanthiza pusilla</i>
Yellow-rumped Thornbill	<i>Acanthiza chrysorrhoa</i>
Yellow Thornbill	<i>Acanthiza nana</i>
Striated Thornbill	<i>Acanthiza lineata</i>
Red Wattlebird	<i>Anthochaera carunculata</i>
Little Wattlebird	<i>Anthochaera chrysoptera</i>
Noisy Friarbird	<i>Philemon corniculatus</i>
Bell Miner	<i>Manorina melanophrys</i>
Noisy Miner	<i>Manorina melanocephala</i>
Lewin's Honeyeater	<i>Meliphaga lewinii</i>
Yellow-faced Honeyeater	<i>Lichenostomus chrysops</i>
White-plumed Honeyeater	<i>Lichenostomus penicillatus</i>
Brown-headed Honeyeater	<i>Melithreptus brevirostris</i>
White-naped Honeyeater	<i>Melithreptus lunatus</i>
New Holland Honeyeater	<i>Phylidonyris novaehollandiae</i>
Eastern Spinebill	<i>Acanthorhynchus tenuirostris</i>
Scarlet Honeyeater	<i>Myzomela sanguinolenta</i>
Jacky Winter	<i>Microeca fascinans</i>
Rose Robin	<i>Petroica rosea</i>
Eastern Yellow Robin	<i>Eopsaltria australis</i>
Eastern Whipbird	<i>Psophodes olivaceus</i>
Crested Shrike-tit	<i>Falcunculus frontatus</i>
Golden Whistler	<i>Pachycephala pectoralis</i>
Rufous Whistler	<i>Pachycephala rufiventris</i>
Grey Shrike-thrush	<i>Colluricincla harmonica</i>
Black-faced Monarch	<i>Monarcha melanopsis</i>



Common Name	Scientific Name
Leaden Flycatcher	<i>Myiagra rubecula</i>
Restless Flycatcher	<i>Myiagra inquieta</i>
Magpie-lark	<i>Grallina cyanoleuca</i>
Rufous Fantail	<i>Rhipidura rufifrons</i>
New Zealand Fantail	<i>Rhipidura fuliginosa</i>
Willie Wagtail	<i>Rhipidura leucophrys</i>
Spangled Drongo	<i>Dicrurus bracteatus</i>
Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>
White-bellied Cuckoo-shrike	<i>Coracina papuensis</i>
Olive-backed Oriole	<i>Oriolus sagittatus</i>
Dusky Woodswallow	<i>Artamus cyanopterus</i>
Grey Butcherbird	<i>Cracticus torquatus</i>
Australian Magpie	<i>Cracticus tibicen</i>
Pied Currawong	<i>Strepera graculina</i>
Australian Raven	<i>Corvus coronoides</i>
White-winged Chough	<i>Corcorax melanorhamphos</i>
Apostlebird	<i>Struthidea cinerea</i>
Eurasian Skylark	<i>Alauda arvensis</i>
Australasian Pipit	<i>Anthus novaeseelandiae rogersi</i>
House Sparrow	<i>Passer domesticus</i>
Red-browed Finch	<i>Neochmia temporalis</i>
Double-barred Finch	<i>Taeniopygia bichenovii</i>
Mistletoebird	<i>Dicaeum hirundinaceum</i>
Welcome Swallow	<i>Hirundo neoxena</i>
Tree Martin	<i>Petrochelidon nigricans</i>
Fairy Martin	<i>Petrochelidon ariel</i>
Cicadabird	<i>Coracina tenuirostris</i>
Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>
Australian Reed-warbler	<i>Acrocephalus australis</i>
Little Grassbird	<i>Megalurus gramineus</i>
Golden-headed Cisticola	<i>Cisticola exilis</i>
Silvereye	<i>Zosterops lateralis</i>
Eurasian Blackbird	<i>Turdus merula</i>
Common Starling	<i>Sturnus vulgaris</i>
Common Myna	<i>Sturnus tristis</i>



Appendix 5. Habitat requirements for locally-occurring threatened fauna species

Invertebrates

Common Name Scientific Name Schedule Listing	Preferred Habitat	Comments
Cumberland Plain Land Snail <i>Meridolum corneovirens</i> TSC Act, Sch. 1, End. EPBC Act, Vul.	Found amongst logs and debris in Cumberland Plain and Castlereagh woodlands.	No suitable natural habitat occurs on the site. Poor connectivity.
Giant Dragonfly <i>Petalura gigantea</i> TSC Act, Sch. 1, End.	Larvae occupy permanent long chambered burrows within swamps with substrate of peaty mud overlaying a sandy substratum, with oxygenated water seeping through it. Such soil may dry out periodically to become quite solid. Larvae shelter sites are not in the flow path of water.	No suitable natural habitat occurs on the site. Poor connectivity.

Mammals

Common Name Scientific Name Schedule Listing	Preferred Habitat	Comments
Large-eared Pied Bat <i>Chalinolobus dwyeri</i> TSC Act, Sch. 2, Vul. EPBC Act, Vul.	Found in drier habitats including dry sclerophyll and woodlands. Roosts in caves and abandoned Fairy Martin nests. Does not roost in tree hollows.	No suitable natural habitat occurs on the site. Poor connectivity.
Eastern False Pipistrelle <i>Falsistrellus tasmaniensis</i> TSC Act, Sch. 2, Vul.	Little known of habitat. Has been found roosting in stem holes of living Eucalypts	No suitable natural habitat occurs on the site. Poor connectivity.
Golden-tipped Bat <i>Kerivoula papuensis</i> TSC Act, Sch. 2, Vul. EPBC Act, Lower risk (near threatened)	Unclear, but probably coastal wet forests, often in areas where wet and dry forests meet. Sometimes roosts in tree hollows, but mainly in disused bird nests.	No suitable natural habitat occurs on the site. Poor connectivity.
Eastern Freetail-bat <i>Mormopterus norfolkensis</i> TSC Act, Sch. 2, Vul.	Dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roosts mainly in tree hollows but will also roost under bark or in man-made structures.	No suitable natural habitat occurs on the site. Poor connectivity.
Eastern Bentwing-bat <i>Miniopterus schreibersii oceanensis</i> TSC Act, Sch. 2, Vul.	Well-timbered valleys. Roosts in caves and storm-water channels and similar structures. Does not roost in tree hollows.	No suitable natural habitat occurs on the site. Poor connectivity.
Southern Myotis <i>Myotis macropus</i> TSC Act, Sch. 2, Vul.	Requires open areas of water over which it hunts. Roosts in caves, under bridges and buildings and sometimes in dense foliage in rainforests. May roost in tree hollows.	No suitable natural habitat occurs on the site. Poor connectivity.
Greater Broad-nosed Bat <i>Scoteanax rueppellii</i>	Found in woodlands, moist and dry sclerophyll forests and rainforests. Prefers	No suitable natural habitat occurs on the site.



Common Name Scientific Name Schedule Listing	Preferred Habitat	Comments
TSC Act, Sch. 2, Vul. EPBC Act, Lower risk (near threatened)	gullies. Roosts in tree hollows only.	Poor connectivity.
Yellow-bellied Sheath-tail-bat <i>Saccolaimus flaviventris</i> TSC Act, Sch. 2, Vul.	Found in a variety of Eucalypt habitats including tall forests and mallee. Roosts in tree hollows and occasionally abandoned Sugar Glider nests	No suitable natural habitat occurs on the site. Poor connectivity.
Grey-headed Flying-fox <i>Pteropus poliocephalus</i> TSC Act, Sch. 2, Vul. EPBC Act, Vul.	Found in rainforest, wet and dry sclerophyll forest and mangroves. Camps are usually in gullies, close to water and in vegetation with a dense canopy. Feeds on a wide variety of flowering and fruiting plants.	No suitable natural habitat occurs on the site. Poor connectivity.
Koala <i>Phascolarctos cinereus</i> TSC Act, Sch. 2, Vul.	Eucalypt forests rich in Swamp Mahogany (<i>E. robusta</i>), Forest Red Gum (<i>E. tereticornis</i>), and Grey Gum (<i>E. punctata</i>).	No suitable natural habitat occurs on the site. Poor connectivity.
Spotted-tailed Quoll <i>Dasyurus maculatus</i> TSC Act, Sch. 2, Vul. EPBC Act, End.	Occurs mostly in sclerophyll forest and woodlands as well as coastal heath lands and rainforests. Requires suitable den sites such as hollows or caves and large areas of intact vegetation.	No suitable natural habitat occurs on the site. Poor connectivity.
Eastern Pygmy-possum <i>Cercartetus nanus</i> TSC Act, Sch. 2, Vul.	Found in a variety of habitats from rainforests through sclerophyll forests to tree heath. Favours areas with abundant Banksias and Myrtaceous shrubs.	No suitable natural habitat occurs on the site. Poor connectivity.
Yellow-bellied Glider <i>Petaurus australis</i> TSC Act, Sch. 2, Vul.	Restricted to tall, mature sclerophyll forests in regions of high rainfall. Requires nesting hollows and a year-round supply of flowering trees.	No suitable natural habitat occurs on the site. Poor connectivity.
Squirrel Glider <i>Petaurus norfolcensis</i> TSC Act, Sch. 2, Vul.	Inhabits dry sclerophyll forest and woodland. Requires abundant hollow-bearing trees and a mix of Eucalypts, acacias and Banksias. At least one floral species should flower heavily in the winter and one or more species of Eucalypts need to be smooth-barked.	No suitable natural habitat occurs on the site. Poor connectivity.
Southern Brown Bandicoot <i>Isodon obesulus</i> TSC Act, Sch. 1, End EPBC Act, End.	Inhabits heath, heathy forest, shrubland and woodland which is usually supported by well-drained soils. It is dependent on the diversity of vegetation that results from recent fires and the associated abundance of insects as a food source.	No suitable natural habitat occurs on the site. Poor connectivity.
Brush-tailed Phascogale <i>Phascogale tapoatafa</i> TSC Act, Sch. 2, Vul.	Inhabits dry sclerophyll open forest, with a sparse ground cover of herbs, grasses, scleromorphic shrubs or leaf litter. May also inhabit heathland, swamps, rainforest and wet sclerophyll forest, primarily where the annual rainfall exceeds 500 mm.	No suitable natural habitat occurs on the site. Poor connectivity.



Frogs

Common Name Scientific name Schedule Listing	Preferred Habitat	Comments
Red-crowned Toadlet <i>Pseudophryne australis</i> TSC Act, Sch. 2, Vul.	Almost totally confined to the Hawkesbury sandstone formation. Found in damp situations but not usually associated with permanent water.	No suitable natural habitat occurs on the site. Poor connectivity.
Heath Frog <i>Litoria littlejohni</i> TSC Act, Sch. 2, Vul. EPBC Act, Vul.	Wet or dry sclerophyll forest associated with sandstone outcrops at altitudes of 280-1000m on the eastern slopes of the Great Dividing Range. Prefers flowing rocky streams. Breeds in the upper reaches of permanent water and perched ponds. Non-breeding habitat includes heath-based forests and woodlands.	No suitable natural habitat occurs on the site. Poor connectivity.
Green-thighed Frog <i>Litoria brevipalmata</i> TSC Act, Sch. 2, Vul.	Rainforest, wet and dry Eucalypt forests and heath, typically in areas where water pools on the surface after rain.	No suitable natural habitat occurs on the site. Poor connectivity.
Booroolong Frog <i>Litoria booroolongensis</i> TSC Act, Sch. 1, End. EPBC Act, End.	Lives along permanent streams with fringing vegetation such as ferns, sedges and grasses. Shelters under rocks amongst vegetation near the streams edge.	No suitable natural habitat occurs on the site. Poor connectivity.
Stuttering Frog <i>Mixophyes balbus</i> TSC Act, Sch. 1, End. EPBC Act, Vul.	Found in rainforest and tall open forest in the foothills and escarpment on the Eastern side of the Great Dividing Range.	No suitable natural habitat occurs on the site. Poor connectivity.
Giant Burrowing Frog <i>Heleioporus australiacus</i> TSC Act, Sch. 2, Vul. EPBC Act, Vul.	Most common on Hawkesbury Sandstone. Males call from burrows which are situated in sandy banks close to water. They are usually associated with crayfish burrows.	No suitable natural habitat occurs on the site. Poor connectivity.
Wallum Froglet <i>Crinia tinnula</i> TSC Act, Sch. 2, Vul.	Found in a wide range of habitats, including wet heath, Paperbark swamps, sedgelands and drainage lines within other vegetation communities. Usually associated with acidic swamps on coastal sand plains, they will persist in disturbed areas.	No suitable natural habitat occurs on the site. Poor connectivity.
Green and Golden Bell Frog <i>Litoria aurea</i> TSC Act, Sch. 1, End. EPBC Act, Vul.	Permanent water sources with vegetated margins in dams, lagoons, streams, swamps or ornamental ponds.	No suitable natural habitat occurs on the site. Poor connectivity.



Reptiles

Common Name Scientific Name Schedule Listing	Preferred Habitat	Comments
Broad-headed Snake <i>Hoplocephalus bungaroides</i> TSC Act, Sch. 1, End. EPBC Act, Vul.	Preferred habitat is exposed sandstone outcrops and benching in vegetation that is mainly woodland, open woodland and heath.	No suitable natural habitat occurs on the site. Poor connectivity.
Heath Monitor <i>Varanus rosenbergi</i> TSC Act, Sch. 2, Vul.	Found in coastal heaths, humid woodlands and both wet and dry sclerophyll forests. Shelters in burrows, hollow logs and rock crevices.	No suitable natural habitat occurs on the site. Poor connectivity.
Leura Skink <i>Eulamprus leuraensis</i> TSC Act, Sch. 1, End. EPBC Act, End.	Restricted to sedge and swamps of the upper and mid Blue Mountains.	No suitable natural habitat occurs on the site. Poor connectivity.

Birds

Common Name Scientific Name Schedule Listing	Preferred Habitat	Comments
Australasian Bittern <i>Botaurus poiciloptilus</i> TSC Act, Sch. 2, Vul.	Inhabits wetlands that generally have permanent fresh water and dense vegetation of sedges, rushes and reeds.	No suitable natural habitat occurs on the site. Poor connectivity.
Black Bittern <i>Ixobrychus flavicollis</i> TSC Act, Sch. 2, Vul.	Both terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation.	No suitable natural habitat occurs on the site. Poor connectivity.
Blue-billed Duck <i>Oxyura australis</i> TSC Act, Sch. 2, Vul.	Mostly found on large, well vegetated, deep fresh-water dams and lakes, especially those with beds of cumbungi	No suitable natural habitat occurs on the site. Poor connectivity.
Bush Stone-curlew <i>Burhinus grallarius</i> TSC Act, Sch. 1 Endangered	. Found in lightly timbered open forest or woodlands. Preferred habitat is often associated with woodlands of casuarina, eucalyptus, acacia and epolycarpa.	No suitable natural habitat occurs on the site. Poor connectivity.
Diamond Firetail <i>Stagonopleura guttata</i> TSC Act Sch. 2, Vul	Mostly inhabits grassy eucalypt woodlands, also occurring in open forest and riparian areas within these. Feeds exclusively on the ground, occurring in flocks between five to 40+ birds	No suitable natural habitat occurs on the site. Poor connectivity.
Eastern Bristlebird <i>Dasyornis brachypterus</i> TSC Act, Sch. 1, EPBC Act. Endangered	Inhabits most habitats so long as there is a low dense cover of vegetation. This species is particularly fire-sensitive and studies have shown they tend to avoid or have very low densities in areas that have had a fire in the past 7 years.	No suitable natural habitat occurs on the site. Poor connectivity.
Flame Robin <i>Petroica phoenicea</i> TSC Act Sch. 2, Vul.	In NSW it breeds in upland moist eucalypt forests and woodlands, often on ridges and slopes, in areas of open understorey. It migrates in winter to more open lowland habitats such as grassland with scattered trees and open woodland on the inland slopes and plains	No suitable natural habitat occurs on the site. Poor connectivity.



Common Name Scientific Name Schedule Listing	Preferred Habitat	Comments
Freckled Duck <i>Stictonetta naevosa</i> TSC Act, Sch. 2, Vul.	Inhabits a variety of plankton-rich wetlands including vegetated swamps, large open lakes, farm dams and flood waters. Aggregate in the non-breeding season on large deep water lakes or dams (fresh or saline).	No suitable natural habitat occurs on the site. Poor connectivity.
Gang-gang Cockatoo <i>Callocephalon fimbriatum</i> TSC Act, Sch. 2, Vul.	In summer, occupies tall montane forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In winter, occurs at lower altitudes in drier, more open eucalypt forests and woodlands – also in urban areas including parks and gardens. Requires tree hollows for nesting	No suitable natural habitat occurs on the site. Poor connectivity.
Glossy Black-cockatoo <i>Calyptrorhynchus lathamii</i> TSC Act, Sch. 2, Vul.	Found in open forests with <i>Allocasuarina</i> species and hollows for nesting.	No suitable natural habitat occurs on the site. Poor connectivity.
Little Eagle <i>Hieraaetus morphnoides</i> TSC Act Sch. 2, Vul.	Occupies open Eucalypt forest, woodland or open woodland. She-oak or acacia woodlands and riparian woodlands are also used. Builds a stick nests in winter in tall living trees within remnant patches	No suitable natural habitat occurs on the site. Poor connectivity.
Olive Whistler <i>Pachycephala olivacea</i> TSC Act, Sch. 2, Vul.	Found in alpine thickets, wetter rainforests, watercourse vegetation, and coastal scrubs. Found in beech forest at about 500m elevation in northern NSW.	No suitable natural habitat occurs on the site. Poor connectivity.
Painted Honeyeater <i>Grantiella picta</i> TSC Act, Sch. 2, Vul.	Found in Eucalypt forests and woodlands. Prefers areas with high densities of mistletoe.	No suitable natural habitat occurs on the site. Poor connectivity.
White-fronted Chat <i>Epthianura albifrons</i> TSC Act Sch. 2, Vul.	Gregarious species, usually found foraging on bare or grassy ground in wetland areas, singly or in pairs. It is insectivorous, feeding mainly on flies and beetles caught from or close to the ground.	No suitable natural habitat occurs on the site. Poor connectivity.
Painted Snipe <i>Rostratula benghalensis australis</i> TSC Act, Sch. 2, Vul.	Inhabits shallow freshwater wetlands, particularly where there is a cover of vegetation. Tends to prefer areas that have a mixture of grass tussocks (nest sites) and open mud areas (feeding sites).	No suitable natural habitat occurs on the site. Poor connectivity.
Pink Robin <i>Petroica rodinogaster</i> TSC Act Sch. 2, Vul.	Inhabits rainforest and tall, open eucalypt forest, particularly in densely vegetated gullies. General distribution Tasmania to South-eastern NSW; in winter may be found as far north as the Central Coast NSW.	No suitable natural habitat occurs on the site. Poor connectivity.
Regent Honeyeater <i>Xanthomyza phrygia</i> TSC Act, Sch. 1, Endangered.	Occurs in temperate Eucalypt woodlands and open forests. Has a particular liking for Box and Ironbark Eucalypts as well as Swamp Mahogany and Spotted Gum.	No suitable natural habitat occurs on the site. Poor connectivity.
Scarlet Robin <i>Petroica boodang</i>	Inhabits dry Eucalypt forests and woodlands, usually prefers grassy	No suitable natural habitat occurs on the site.



Common Name Scientific Name Schedule Listing	Preferred Habitat	Comments
TSC Act Sch. 2, Vul.	understorey with scattered shrubs. Occasionally occurs in mallee or wet forest communities	Poor connectivity.
Speckled Warbler <i>Pyrholaemus sagittatus</i> TSC Act Sch. 2, Vul.	Inhabits Eucalypt dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy	No suitable natural habitat occurs on the site. Poor connectivity.
Spotted Harrier <i>Circus assimilis</i> TSC Act Sch. 2, Vul.	Occurs in grassy open woodland including acacia and mallee remnants, inland riparian woodland, grassland. It is found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands.	No suitable natural habitat occurs on the site. Poor connectivity.
Square-tailed Kite <i>Lophoictinia isura</i> TSC Act, Sch. 2, Vul.	Inhabits coastal forest and woodlands. Most commonly associated with ridge and gully forests dominated by Woollybutt, Spotted Gum or Peppermint Gum.	No suitable natural habitat occurs on the site. Poor connectivity.
Swift Parrot <i>Lathamus discolor</i> TSC Act, Sch. 2, Vul. EPBC Act, End.	Occurs in a variety of Eucalypt forests. Migrates from Tasmania to the mainland during the winter/autumn months to feed mostly on winter flowering Eucalypts	No suitable natural habitat occurs on the site. Poor connectivity.
Turquoise Parrot <i>Neophema pulchella</i> TSC Act, Sch. 2, Vul.	Occurs in eucalyptus woodlands and open forests with a ground cover of grasses and low understorey of shrubs.	No suitable natural habitat occurs on the site. Poor connectivity.
Wompoo Fruit Dove <i>Ptilinopus magnificus</i> TSC Act, Sch. 2, Vul.	Found in or near rainforest, low elevation moist forest and brush box forests.	No suitable natural habitat occurs on the site. Poor connectivity.
Varied Sittella <i>Daphoenositta chrysoptera</i> TSC Act Sch. 2, Vul.	Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland	No suitable natural habitat occurs on the site. Poor connectivity.
Powerful Owl <i>Ninox strenua</i> TSC Act, Sch. 2, Vul.	Pairs occupy permanent territories in mountain forests, gullies and forest margins, sparser hilly woodlands, coastal forests, woodlands and scrubs.	No suitable natural habitat occurs on the site. Poor connectivity.
Barking Owl <i>Ninox connivens</i> TSC Act, Sch. 2, Vul.	Found in open forests, woodlands, dense scrubs, river red gums and other large trees near watercourses.	No suitable natural habitat occurs on the site. Poor connectivity.
Sooty Owl <i>Tyto tenebricosa</i> TSC Act, Sch. 2, Vul.	Tall, wet forests in sheltered mountain gullies, usually with an east and Southeast aspect.	No suitable natural habitat occurs on the site. Poor connectivity.
Masked Owl <i>Tyto novaehollandiae</i> TSC Act, Sch. 2, Vul.	Forests, open woodlands and farms with large trees, e.g. river red gums adjacent to cleared country.	No suitable natural habitat occurs on the site. Poor connectivity.



Appendix 6. Habitat requirements for locally-occurring threatened plant species

Botanical name conservation status	Habitat description	Suitable habitat on site
<i>Acacia asparagoides</i> ROTAP, 2R	Grows in dry sclerophyll forest or occasionally heath on sandstone.	No
<i>Acacia baueri</i> subsp. <i>aspera</i> ROTAP, 2RC – TSC Act, Sch. 2, Vul.	Grows in low heath, often on exposed sandstone ridges.	No
<i>Acacia bynoeana</i> ROTAP, 3VC – TSC Act, Sch. 1, End. EPBC Act, Vul.	Grows mainly in heath and dry sclerophyll forest, in sandy soils.	No
<i>Acacia clunies-rossiae</i> ROTAP, 2RC – † TSC Act, Sch. 2, Vul.	Grows in dry sclerophyll forest, in valleys, on slopes and ridges, and along creeks.	No
<i>Acacia flocktoniae</i> ROTAP, 2VC – TSC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in dry sclerophyll forest on sandstone.	No
<i>Acacia gordonii</i> ROTAP, 2K TSC Act, Sch. 1, End. EPBC Act, End.	Grows in dry sclerophyll forest and heath on sandstone outcrops.	No
<i>Acacia pubescens</i> ROTAP, 3VCa TSC Act, Sch. 2, Vul. EPBC Act, Vul.	Usually grows in dry sclerophyll forest and woodland in clay soils. Often in roadside and railside bushland remnants.	No
<i>Acacia terminalis</i> subsp. <i>terminalis</i> ROTAP, 2RCi TSC Act, Sch. 1, End. EPBC Act, End.	Scattered or locally common in scrub and open eucalypt woodland or forest, usually in sandy soil on creek banks, hillslopes or in shallow soil in rock crevices and sandstone platforms on cliffs.	No
<i>Acrophyllum australe</i> ROTAP, 2VCi TSC Act, – Sch. 2, Vul. EPBC Act, Vul.	Grows in damp crevices in sandstone, usually near waterfalls. Restricted to the Blue Mtns, near Springwood, Linden, Woodford and Lawson.	No
<i>Allocasuarina glareicola</i> ROTAP, 2E TSC Act, Sch. 1, End. EPBC Act, End.	Grows in open forest on lateritic soil; restricted to a few small populations in or near Castlereagh S.F., NE of Penrith.	No
<i>Almaleea incurvata</i> ROTAP, 2RC – †	Grows in swamps dominated by sedges and/or shrubs, on sandstone; restricted to the Blue Mtns.	No
<i>Amperea xiphioclada</i> var. <i>papillata</i> ROTAP, 3KC	Grows with other native sedges and rushes in swamps on sandstone at altitudes of greater than 600 m.	No
<i>Ancistrachne maidenii</i> ROTAP, 2KC – TSC Act, Sch. 2, Vul.	Grows on sandstone soils; north of Sydney.	No
<i>Angophora crassifolia</i> ROTAP, 2RCa	Locally frequent but restricted to the Ku-ring-gai Plateau region.	No
<i>Asterolasia elegans</i> ROTAP, 2ECa TSC Act, Sch. 1, End. EPBC Act, End.	Grows in wet sclerophyll forest on moist hillsides, known from only one locality, north of Maroota.	No



Botanical name conservation status	Habitat description	Suitable habitat on site
<i>Atkinsonia ligustrina</i> ROTAP, 2RCa	Occurs in woodland and heath in exposed sites, a single plant often parasitic on the roots of many nearby plants; confined to a small area in the Blue Mtns.	No
<i>Banksia conferta</i> var. <i>penicillata</i> TSC Act, Sch. 1, End.	Grows in dry sclerophyll forest or woodland, restricted to small populations in the Blue Mtns on sandstone cliffs or steep slopes and around rocky outcrops.	No
<i>Blandfordia cunninghamii</i> ROTAP, 3RCi	Grows in damp shallow sandy and peaty soils, often on sandstone cliff edges; chiefly in the Blue Mtns and Illawarra areas.	No
<i>Blechnum gregsonii</i> ROTAP, 2RCa	Pendent clumps found in cool rainforest, often in damp places near waterfalls, sometimes epiphytic; chiefly in the Blue Mtns and Illawarra coastal ranges.	No
<i>Boronia fraseri</i> ROTAP, 2RCa (UBBS 97 Recommend)	Grows mainly in wet sclerophyll forest and in rainforest in gullies on sandstone, chiefly in the Sydney region.	No
<i>Boronia serrulata</i> ROTAP, 2RC -	Grows in moist heath in sandy situations, chiefly in a coastal band in the Sydney district; record for the SWS in Jacobs & Pickard (1981) not substantiated.	No
<i>Brasenia schreberi</i> ROTAP, 3RC- +	Widespread but rarely common, found in shallow freshwater lagoons or backwaters.	No
<i>Callistemon linearifolius</i> ROTAP, 2RCi TSC Act, Sch. 2, Vul.	Grows in dry sclerophyll forest on the coast and adjacent ranges, chiefly from Georges R. to the Hawkesbury R.	No
<i>Callistemon shiressii</i> ROTAP, 3RC -	Grows on shale ridges, in moist eucalypt forest and rainforest gullies, occasionally along riverbanks; chiefly from Colo R. to Gosford district, also Howes Valley to Bulga district.	No
<i>Carex klaphakei</i> TSC Act, Sch. 1, End.	Known only from a few localities on Central Tablelands near Blackheath, Mt Werong and Penrose at 600–1200 m alt.	No
<i>Chamaesyce psammogeton</i> TSC Act, Sch. 1, End.	Grows on dunes and sea strandlines.	No
<i>Cynanchum elegans</i> ROTAP, 3ECi TSC Act, Sch. 1, End. EPBC Act, End.	Rare, recorded from rainforest gullies scrub and scree slopes; from the Gloucester district to the Wollongong area and inland to Mt Dangar.	No
<i>Cyphanthera scabrella</i> ROTAP, 2RC -	Grows in dry or wet sclerophyll forest in sandstone-derived soil; restricted to Bilpin-Mt Wilson area in Blue Mtns.	No
<i>Darwinia biflora</i> ROTAP, 2VCa TSC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in heath on sandstone or in the understorey of woodland on shale-capped ridges; Cheltenham to Hawkesbury R., rare.	No
<i>Darwinia diminuta</i> ROTAP, 2RCi	Grows in heath or dry sclerophyll forest in poorly drained sandy soil; Manly to Ingleside and Loftus to Helensburgh, rare.	No
<i>Darwinia fascicularis</i> subsp. <i>oligantha</i> TSC Act, Sch. 1, End. Pop. (Baulkham Hills)	Grows in heath or shallow soils; higher parts of the Blue Mtns.	No
<i>Darwinia grandiflora</i> ROTAP, 2RCi	Grows in dry sclerophyll forest and woodland on poorly drained sandy soil; Woronora Plateau and Illawarra region, rare.	No



Botanical name conservation status	Habitat description	Suitable habitat on site
<i>Darwinia peduncularis</i> ROTAP, 3RCi TSC Act, Sch. 2, Vul.	Grows in dry sclerophyll forest on sandstone hillsides and ridges; Hornsby to Hawkesbury R. and west to Glen Davis, rare.	No
<i>Deyeuxia appressa</i> ROTAP, 2E TSC Act, Sch. 1, End. EPBC Act, End.	Grows on wet ground; in the Hornsby area.	No
<i>Deyeuxia microseta</i> ROTAP, 3KC -	Grows in montane sclerophyll forest, especially wetter areas.	No
<i>Dillwynia tenuifolia</i> ROTAP, 2RCa TSC Act, Sch. 2, Vul.	Grows in dry sclerophyll woodland on sandstone, shale or laterite; from Cumberland Plain, Blue Mtns to Howes Valley area.	No
<i>Discaria pubescens</i> ROTAP, 3RCa	In woodland and forest, often in rocky situations; widespread, but considered endangered.	No
<i>Diuris aequalis</i> ROTAP, 3VC - TSC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows among grass in sclerophyll forest, mainly in the ranges and tablelands; chiefly from Braidwood to Kanangra and Liverpool.	No
<i>Epacris hamiltonii</i> ROTAP, 2ECi TSC Act, Sch. 1, End. EPBC Act, End.	Grows in skeletal sandy soils in sheltered damp rock situations on sandstone in the Blackheath area.	No
<i>Epacris muelleri</i> ROTAP, - 3RC -	Grows on skeletal soils on damp rock faces on sandstone in the Blue Mtns and Wollemi N.P.	No
<i>Epacris purpurascens</i> var. <i>purpurascens</i> TSC Act, Sch. 2, Vul.	Grows in sclerophyll forest, scrubs and swamps on sandstone from Gosford and Sydney districts.	No
<i>Epacris sparsa</i> ROTAP, 2VCi TSC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in sandy soil among rocks beside Grose R.	No
<i>Eucalyptus apiculata</i> ROTAP, 3RC-	Rare and localized, in mallee shrubland on skeletal sandy soil on sandstone; sporadic occurrences between Linden and Berrima.	No
<i>Eucalyptus baeuerlenii</i> ROTAP, 3RCa	Locally frequent but restricted, in wet forest or woodland in sheltered often sloping sites; from Wentworth Falls to Budawang Ra.	No
<i>Eucalyptus benthamii</i> ROTAP, 2VCi TSC Act, Sch. 2, Vul. EPBC Act, Vul.	Restricted but locally abundant, in wet forest on sandy alluvial soils along valley floors; confined to the lower Nepean R. area.	No
<i>Eucalyptus burgessiana</i> ROTAP, 2RCa	Locally frequent but restricted, in mallee shrubland on skeletal sand on sandstone; restricted to lower Blue Mtns.	No
<i>Eucalyptus camfieldii</i> ROTAP, 2VCi TSC Act, Sch. 2, Vul. EPBC Act, Vul.	Rare and localized, in coastal shrub heath on sandy soils on sandstone, often of restricted drainage; from Gosford to Royal N.P.	No
<i>Eucalyptus cannonii</i> ROTAP, 2VCi TSC Act, Sch. 2, Vul.	Locally frequent but restricted, in sclerophyll woodland on shallow soil on rises; Rylstone to upper Wolgan Valley.	No
<i>Eucalyptus copulans</i> ROTAP, 2E TSC Act, Sch. 1, End. EPBC Act, End.	Locally frequent but restricted, in sclerophyll woodland on shallow soil on rises; Rylstone to upper Wolgan Valley.	No



Botanical name conservation status	Habitat description	Suitable habitat on site
<i>Eucalyptus cunninghamii</i> ROTAP, 2RCa	Restricted but locally frequent, in mallee heath skeletal sandy soil on sandstone; confined to central Blue Mtns.	No
<i>Eucalyptus</i> sp. 'Cattai' TSC Act, Sch. 1, End.	Grows as isolated trees or small groups of trees in scrub, heath and low woodland, in sandstone-derived soils.	No
<i>Eucalyptus leuhmanniana</i> ROTAP, 2RCa	Locally abundant but restricted, in mallee heath on shallow infertile sandy soils of poor drainage on sandstone; confined to coastal plateau between the Hawkesbury R. and Bulli.	No
<i>Euphrasia bowdeniae</i> ROTAP, 2VCit TSC Act Sch. 2, Vul. EPBC Act, Vul.	Grows on sandstone cliffs in shallow soil on ledges or sometimes trailing over rock, in higher parts of Blue Mtns.	No
<i>Genoplesium baueri</i> TSC Act, Sch. 1, End.	Prefers sandy dry Eucalyptus habitats	No
<i>Grammitis stenophylla</i> TSC Act, Sch. 1, End.	Prefers moist shaded gullies, typically grows on rocks near moss.	No
<i>Grevillea caleyi</i> TSC Act, Sch. 1, End. EPBC Act, End.	Grows on sandy soil with lateritic influences, typically on ridges.	No
<i>Microtis angusii</i> TSC Act, Sch. 1, End. EPBC Act, End.	Difficult to determine, growing among weeds and on a disturbed soil. Possibly prefers sandy soils with lateritic influences.	No
<i>Gonocarpus longifolius</i> ROTAP, 3RC -	Grows in shrub communities on sandstone; mainly on the ranges from Armidale to the Blue Mtns, east of Rylstone.	No
<i>Goodenia rostrivalvis</i> ROTAP, 2RCa	Grows on damp south-facing sandstone cliffs in Blue Mtns, in the Wentworth Falls area, rare.	No
<i>Grevillea juniperina</i> subsp. <i>juniperina</i> TSC Act, Sch. 2, Vul.	Grows in open dry sclerophyll (eucalypt-dominated) forest or woodland, at altitudes of less than about 50 m, in sandy to clay-loam soils and red pseudolateritic gravels.	No
<i>Grevillea longifolia</i> ROTAP, 2RC -	Grows in moist areas of sclerophyll forest, often near creeks, on Hawkesbury sandstone; chiefly the southern half of Sydney Basin, and Woronora Plateau; possibly also in Lawson area.	No
<i>Grevillea obtusiflora</i> TSC Act, Sch. 1, End. EPBC Act, End.	Grows in sandy loam soils in open low scrub beneath dry sclerophyll forest in the Kandos area.	No
<i>Grevillea parviflora</i> subsp. <i>parviflora</i> TSC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in heathy associations or shrubby woodland, in sandy or light clay soils usually over shale substrates.	No
<i>Gyrostemon thesioides</i> ROTAP, 2KC - TSC Act Sch. 1, End.	Grows on hillsides and riverbanks, only from sites near Georges (30 yrs ago) and Nepean Rivers (90 yrs ago). May already be extinct.	No
<i>Hakea constablei</i> ROTAP, 2RCa	In dry sclerophyll forest on rocky outcrops, scattered in the Blue Mtns between 500–1100 m alt., from Bell to Mt Wilson, rare.	No
<i>Haloragodendron lucasii</i> TSC Act, Sch. 1, End. EPBC Act, End.	Grows in dry sclerophyll open forest on sheltered slopes near creeks on sandstone; confined to Sydney area, rare.	No
<i>Hibbertia hermannifolia</i> ROTAP, 3RCa	Open forest on sandstone; confined to Bents Basin (Nepean R.), Yarowitch district and the coastal ranges south from Wadbilliga N.P.; rare.	No



Botanical name conservation status	Habitat description	Suitable habitat on site
<i>Hibbertia nitida</i> ROTAP, 2RC -	Widespread on sandstone in the Sydney district.	No
<i>Hymenophyllum lyallii</i> (was <i>Sphaerocionium lyallii</i>) ROTAP, 3RC - +	Grows on rocks or trees in moist rainforest in the Blue Mtns and ranges of the south coast.	No
<i>Hymenophyllum pumilum</i> ROTAP, 3RC -	Epiphytic in cooler rainforest of the Blue Mtns and adjacent ranges; uncommon.	No
<i>Isopogon fletcheri</i> ROTAP, 2VCa TSC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in dry sclerophyll forest and heath on sandstone; confined to sheltered moist positions on the escarpment in the Blackheath district of the Blue Mtns, rare.	No
<i>Isotoma sessiliflora</i> (was <i>Hypsela sessiliflora</i>) ROTAP, 2X TSC Act, Sch. 1, End.	Grows in damp places, on the Cumberland Plain, very rare.	No
<i>Keraudrenia corollata</i> var. <i>denticulata</i> ROTAP, 3RC -	Mostly on sandstone. Rare; recorded from near Grafton and west of Sydney.	No
<i>Kunzea cambagei</i> ROTAP, 2VCa TSC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in heath; known mainly from near Mt Werong and Berrima.	No
<i>Kunzea rupestris</i> ROTAP, 2VCa TSC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in heath on rock platforms; known only from between Lower Portland and Kuring-gai Chase N.P.	No
<i>Lasiopetalum joyceae</i> ROTAP, 2RC - TSC ACT, Sch. 2, Vul. EPBC Act, Vul.	Grows in heath on sandstone; Hornsby Plateau.	No
<i>Leionema lachnaeoides</i> ROTAP, 2ECi TSC Act, Sch. 1, End. EPBC Act, End.	Rare, from higher Blue Mtns, on barren rocky situations.	No
<i>Lepidosperma evansianum</i> TSC Act, Sch. 2, Vul.	Grows on wet sandstone cliff faces.	No
<i>Leptospermum rupicola</i> ROTAP, -3RC -	Grows in shrubby communities and heath on sandstone cliffs and escarpments.	No
<i>Leucopogon exolasius</i> ROTAP, 2VC - TSC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in woodland on sandstone, restricted to the Woronora and Grose Rivers and Stokes Creek, Royal N.P.	No
<i>Leucopogon fletcheri</i> subsp. <i>fletcheri</i> ROTAP, 2RC - TSC Act, Sch. 1, End.	Grows in woodland on lateritic soils; rare, in the Springwood area.	No
<i>Lissanthe sapida</i> ROTAP, 3RCa	Grows in open woodland and dry sclerophyll forest, on rocky sandstone ridges and hillsides on sandy soil; occasional, from Bargo to Coloul Ra. and Blackheath.	No
<i>Lomandra brevis</i> ROTAP, 2RC -	Grows in dry sclerophyll forest on sandstone-derived soils in the Sydney region; not common.	No
<i>Lomandra fluviatilis</i> ROTAP, 3RCa	Grows in creek beds on sandy soils; in the Royal N.P. to Colo R	No



Botanical name conservation status	Habitat description	Suitable habitat on site
<i>Marsdenia viridiflora</i> subsp. <i>viridiflora</i> TSC Act, Sch. 1, End. Pop.	Grows in woodland and scrub; north from the Razorback Ra. (Bankstn, Blacktn, Camden, Campbelltn, Fairfield, Holroyd, Liverpool & Penrith LGAs)	No
<i>Melaleuca deanei</i> ROTAP, 3RC- TSC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in wet heath on sandstone; uncommon, in coastal districts from Berowra to Nowra.	No
<i>Micromyrtus blakelyi</i> ROTAP, 2VCi TSC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in heath in depressions on sandstone rock platforms; restricted to areas near the Hawkesbury R.	No
<i>Micromyrtus minutiflora</i> ROTAP, 2V TSC Act, Sch. 1, End. EPBC Act, Vul.	Grows in dry sclerophyll forest in western part of the Cumberland Plain; rare.	No
<i>Monotoca ledifolia</i> ROTAP, 3RC -	Grows in exposed sites in dry sclerophyll forest and shrubland on sandstone in the Woronora Plateau and Blue Mtns area.	No
<i>Notochloe microdon</i> ROTAP, 2RC -	Grows in moist shady areas of the Blue Mtns district.	No
<i>Olearia cordata</i> ROTAP, 2VCi TSC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in dry sclerophyll forest and open shrubland, on sandstone; chiefly from Wisemans Ferry to Wollombi.	No
<i>Olearia quercifolia</i> ROTAP, 3RC -	Grows in swampy or moist terrain; confined to the Blue Mtns.	No
<i>Ozothamnus adnatus</i> ROTAP, 3KC-	Grows in sclerophyll forest and woodland, usually on sandy soil; rare, south from Guyra district.	No
<i>Persoonia acerosa</i> ROTAP, 2VC - TSC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in heath or dry sclerophyll forest on sandstone; central Blue Mtns south to Hill Top.	No
<i>Persoonia bargoensis</i> ROTAP, 2V TSC Act, Sch. 1, End. EPBC Act, Vul.	Grows in woodland to dry sclerophyll forest, on sandstone and laterite; restricted to the Bargo area.	No
<i>Persoonia hirsuta/evoluta</i> ROTAP, 3KCi TSC Act, Sch. 1, End. EPBC Act, End.	Grows in woodland to dry sclerophyll forest on sandstone; both subspecies occurring as isolated individuals or very small populations.	No
<i>Persoonia laxa</i> TSC Act, Sch. 1, Ext. EPBC Act, Ext.	Considered extinct. Probably prefers heath or sclerophyll forest with sandy soils.	No
<i>Persoonia mollis</i> subsp. <i>maxima</i> ROTAP, 2E TSC Act, Sch. 1, End. EPBC Act, End.	Grows in dry to wet sclerophyll forest on Hawkesbury sandstone, Cowan–Hornsby area.	No
<i>Persoonia nutans</i> ROTAP, 2ECi TSC Act, Sch. 1, End. EPBC Act, End.	Grows in woodland to dry sclerophyll forest on laterite and alluvial sand; confined to the Cumberland Plain.	No



Botanical name conservation status	Habitat description	Suitable habitat on site
<i>Pherosphaera fitzgeraldii</i> (was <i>Microstrobos fitzgeraldii</i>) ROTAP, 2ECi TSC Act, Sch. 1, End.	Usually grows on wet rocks within the spray of waterfalls or on ledges or in caves near waterfalls; restricted to southerly aspects on sandstone near waterfalls in the Katoomba to Wentworth Falls area of the Blue Mtns.	No
<i>Philotheca obovalis</i> (was <i>Eriostemon obovalis</i>) ROTAP, 3RCa	Grows in heath and dry sclerophyll forest on sandstone; chiefly in the Blue Mountains, also recorded for Kydra Mountain.	No
<i>Pilularia novae-hollandiae</i> TSC Act, Sch. 1, End.	Widespread but not common in seasonally dry depressions and margins of marshes; may grow submerged.	No
<i>Pimelea curviflora</i> var. <i>curviflora</i> TSC Act, Sch. 2, Vul. EPBC Act, Vul.	Confined to coastal areas around Sydney on sandstone.	No
<i>Pimelea spicata</i> ROTAP, 3ECi TSC Act, Sch. 1, End. EPBC Act, End.	Grows on the coast from Lansdowne to Shellharbour and inland to Penrith; rare.	No
<i>Platysace clelandii</i> ROTAP, 2RCa	Grows among sandstone boulders in dry sclerophyll forest, from Glen Davis to Berowra.	No
<i>Pomaderris brunnea</i> ROTAP, 2VC - TSC Act, Sch. 2, Vul. EPBC Act, Vul.	In open forest, confined to the Colo R. and upper Nepean R.	No
<i>Prostanthera cryptandroides</i> TSC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows chiefly in the Lithgow to Sandy Hollow districts.	No
<i>Prostanthera marifolia</i> TSC Act, Sch. 4, Ext A. EPBC Act, CE.	Occurs in sandy soils with clay-loam and ironstone on ridge tops.	No
<i>Pseudanthus divaricatissimus</i> ROTAP, 3RCa	Mostly from Muswellbrook to Bega, with outlying populations near Urbenville and Dubbo (Goonoo State Forest).	No
<i>Pterostylis gibbosa</i> ROTAP, 2E (X-WSyd) TSC Act, Sch. 1, End. EPBC Act, End.	Grows among grass in sclerophyll forest; rare, chiefly in the southern parts of the central coast, with a disjunct population in the Hunter Valley.	No
<i>Pterostylis saxicola</i> ROTAP, (2E) TSC Act, Sch. 1, End. EPBC Act, End.	Grows in shallow soil over sandstone sheets, often near streams; rare, from Picnic Point to Picton area.	No
<i>Pultenaea</i> sp. 'Genowlan Point' (NSW 417813) TSC Act, Sch. 1, Crit. End. EPBC Act, Crit. End.	It is endemic to New South Wales and is only found at Genowlan Point in the Capertee Valley. At Genowlan Point, <i>Pultenaea</i> sp. 'Genowlan Point' (Allen s.n., 29 Nov. 1997) is restricted to well drained stoney soils.	No
<i>Pultenaea glabra</i> EPBC Act, Vul.	Grows in dry sclerophyll forest on sandstone; higher Blue Mtns and Glen Davis area.	No
<i>Pultenaea parviflora</i> ROTAP, 2E TSC Act, Sch. 1, End. EPBC Act, Vul.	Grows in dry sclerophyll forest on Wianamatta Shale, laterite or alluvium, Cumberland Plain.	No



Botanical name conservation status	Habitat description	Suitable habitat on site
<i>Pultenaea pedunculata</i> TSC Act, Sch. 1, End.	Grows in dry sclerophyll forest and disturbed sites on a variety of soils on the South Coast and edge of the Southern Tableland, but with disjunct restricted populations on Wianamatta Shale on the Cumberland Plain in N.S.W.	No
<i>Pultenaea villifera</i> var. <i>villifera</i> ROTAP, 3RC - TSC Act, Sch. 1, End. Pop. (Lower Blue Mountains)	Grows in dry sclerophyll forest on sandy soil; lower Blue Mtns to Eden district.	No
<i>Rhizanthella slateri</i> ROTAP, 3KC - TSC Act, Sch. 2, Vul. EPBC Act, End.	Grows in sclerophyll forest in shallow to deep loams. Collections tend to be accidental and it is not possible to determine distribution accurately; recorded for the Blue Mtns, also Bulahdelah south to Dharug N.P.	No
<i>Rupicola apiculata</i> ROTAP, 2RCa	Grows in skeletal sandy soils in damp situations on sandstone rock ledges between 700–1100 m alt.; restricted to the Blue Mtns.	No
<i>Rupicola ciliata</i> ROTAP, 2RC – †	Grows in skeletal sandy soils in rock crevices, on rock ledges and beneath cliff overhangs in Kurrajong Heights, Bilpin to lower Yarramun Creek areas in the Blue Mtns.	No
<i>Rupicola sprengelioides</i> ROTAP, 2RC – †	Restricted to skeletal sandy soils on sandstone ledges, cliff faces and rocky ground, in the Burragorang Valley.	No
<i>Sprengelia monticola</i> ROTAP, 2RC – †	Grows on wet rock faces and ledges or cliff bases on sandstone in the Blue Mtns.	No
<i>Syzygium paniculatum</i> TSC Act, Sch. 1, End. EPBC Act, Vul.	Rainforest and open forest near riparian zones.	No
<i>Tetradthea glandulosa</i> ROTAP, – 2VC - TSC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in sandy or rocky heath or scrub, from Mangrove Mtn to the Blue Mtns and Sydney.	No
<i>Tetradthea neglecta</i> ROTAP, 3RC -	Grows in sandy heath and dry sclerophyll forest; chiefly in the Sydney district, south to Robertson.	No
<i>Thesium australe</i> ROTAP, 3VCi TSC Act, -Sch. 2, Vul. EPBC Act, Vul.	Grows in grassland or woodland, often in damp sites; widespread but rare and possibly endangered.	No
<i>Tylophora woollsii</i> ROTAP, 2E TSC Act, Sch. 1, End. EPBC Act, End.	Grows in wet sclerophyll forest and rainforest in the Clouds Creek area near Nymboida and in sclerophyll forest near Parramatta; rare.	No
<i>Velleia perfoliata</i> ROTAP, 2VC - TSC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in heath on shallow sandy soil over sandstone; confined to the Hawkesbury district to the upper Hunter Valley.	No
<i>Veronica lithophila</i> (was <i>Parahebe lithophila</i>) ROTAP, 2RC -	Grows on cliffs or rock exposures, in pockets of soil over sandstone or quartzite; Blue Mtns-Colong region at 650–870 m alt., uncommon.	No
<i>Wilsonia backhousei</i> TSC Act, Sch. 2, Vul.	Grows in coastal saltmarshes; chiefly in the Sydney district, also common at Jervis Bay.	No
<i>Zieria coventyi</i> TSC Act, Sch. 1, End. EPBC Act, End.	Grows in eucalypt woodland on sandy soils; known only from Narrow Neck Peninsular in the Blue Mtns N.P.	No



Botanical name conservation status	Habitat description	Suitable habitat on site
<i>Zieria involucrate</i> ROTAP, 2VCa TSC Act, Sch. 1, End. EPBC Act, Vul.	Grows in wet sclerophyll forest, chiefly in the Lower Blue Mtns; rare.	No
<i>Zieria murphyi</i> ROTAP, 2VC- TSC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in dry sclerophyll forest in sandy soils; on the ranges from Mt Tomah to Penrose district.	No
<i>Zieria prostrata</i> TSC Act, Sch. 1, End. EPBC Act, End.	Restricted to low coastal heaths, near Coffs Harbour; rare.	No

Species of national/state significance with unsubstantiated records in western Sydney

Acacia mathewii (Cattai NP)
Atkinsonia ligustrina (Grose Vale)
Boronia serrulata (Baulkham Hills)
Deyeuxia appressa (Duck River, Auburn)
Haloragis exalata var. *exalata* (Maroota, Baulkham Hills)
Syzygium paniculatum (Cornelia, Baulkham Hills)

Key

TSC Act 1995:

Sch1 = Schedule 1: Endangered species
 Part 1: endangered species
 Part 2: endangered populations
 Part 3: endangered ecological communities
 Part 4: species presumed extinct
 Sch2 = Schedule 2: Vulnerable species

EPBC Act 1999:

CE = Critically Endangered
 E = Endangered
 V = Vulnerable
 EP = Endangered Population

W-Syd End = Western Sydney endemic species

X – WSyd = Extinct in western Sydney

ROTAP Codes

1 Known by one collection only
 2 Geographic range in Australia < 100Km
 3 " " " " > 100Km
 E Endangered
 V Vulnerable
 R Rare
 X Extinct
 K Poorly known
 C Reserved
 a > or = 1000 plants reserved
 i < 1000 plants reserved
 † Total known population reserved
 - Reserved population size unknown
 + Overseas occurrence



Appendix 7. Company Profile

Abel Ecology has been in the flora and fauna consulting business since 1991, starting in the Sydney Region, and progressively more state wide in New South Wales since 1998, and now also in Victoria. During this time extensive expertise has been gained with regard to Master Planning, Environmental Impact assessments including flora and fauna, bushfire reports, Vegetation Management Plans, Management of threatened species, Review of Environmental Factors, Species Impact Statements and as Expert Witness in the Land and Environment Court. We have done consultancy work for industrial and commercial developments, golf courses, civil engineering projects, tourist developments as well as residential and rural projects. This process has also generated many connections with relevant government departments and city councils in NSW. Our team consists of four scientists and two administrative staff, plus casual assistants as required.

Licences

NPWS s132C Scientific licence number is SL100780 expires 30 April 2015

NPWS GIS data licence number is CON95034

DG NSW Dept of Primary Industries Animal Care and Ethics Committee Approval expires 8 December 2015

DG NSW Dept of Primary Industries Animal Research Authority expires 8 December 2014

The Consultancy Team

Dr Danny Wotherspoon

Grad Dip Bushfire Protection (University of Western Sydney 2012)

PhD, researching Cumberland Plain vegetation and fauna habitat, at Centre for Integrated Catchment Management (University of Western Sydney, 2007)

Planning for Bushfire Protection Certificate course (University of Technology, 2006)

Consulting Planners Bushfire Training Course (Planning Institute of Australia, 2003)

MA (Macquarie University, 1991)

Wildlife Photography Certificate (Sydney Technical College, 1987)

Herpetological Techniques Certificate (Sydney Technical College, 1986)

Applied Herpetology Certificate (Sydney Technical College, 1980)

Dip Ed (University of New England, 1978)

BSc (University of New England - Triple Majors in Zoology, incl. Ecological Zoology, 1974)

Dr Daniel McDonald

PhD (The University of Sydney 2006)

M. Agr (The University of Sydney 1996)

B. Ag Sc. (The University of Sydney 1991)

Jesse Tree

Bachelor of Natural Sciences and Horticulture (University of Western Sydney, (2013,

Cert 111 in Information Technology (Western Sydney TAFE, 2009).